

Reflection Paper

Johannes Bohn_5626285___AR3AE100_Architectural Engineering

What is the relation between your graduation project topic, your master track, and your master programme?

The primary objective of this graduation project is the revitalisation of a neglected high-potential building, the HaKa building, located in the Vierhaven area in Rotterdam. This area, part of the Rotterdam city port, has been secluded from the city since its inception. Initially, this seclusion was intended and desired in order to keep residential neighbourhoods away and provide sufficient space for transportation infrastructure. Today, the before mentioned reasons for spacial separation do not apply as the Vierhaven is not an active harbour anymore.

Revitalising the HaKa building comes with challenges beyond redesigning and upgrading an existing building. These include social, environmental and technical challenges as well as addressing issues of the larger urban fabric. Playing within the aE studios' theme 'Second Life', the project aims to tackle the challenges of the site around the building as well as the inherent issues of a 1930s industrial harbour building.

The project aims at creating a local micro-economic environment in the Vierhaven area with the HaKa building forming the centerpiece of that economy. To achieve this, modes of local production, in-house CNC production and reuse of locally harvested construction materials, are applied for new construction of building additions for the HaKa building as well as the rest of the neighbourhood. As part of the micro-economy concept, striving towards energetic autonomy is a vital aim for the area and the HaKa building to support itself energetically. To combine local production and local energy generation & storage, a strategy for choosing building components was developed. On the one hand, to support local production and to minimise negative environmental impact, low-impact, waste-based and locally harvested materials are being used. On the other hand, to enable sufficient local energy generation & storage and overall energetic performance of the building, investments in newly produced components with high efficiency were chosen.

Acknowledging the potential of existing buildings is the first and possibly one of the most important steps toward a sustainable building industry. The question of how to deal with the existing and how to build up on its potential is — within the aE studio, the faculty of architecture at TU Delft as well as the current building industry — a pressing topic and new and innovative solutions need to be introduced.

How did your research influence your design and how did the design influence your research?

Initially, the research topic was chosen based on the current design thoughts. Dealing with an existing open structure building, the question arose how to locally produce a wall system, that can be customised to the varying measurements of the existing building and, simultaneously, be demountable to allow for future changes. In the course of the first weeks of the aE graduation studio, I investigated the possibilities of CNC-milling in the construction sector which eventually led me to my research topic. Studying the potential of CNC-milling and how to engage it for the production of demountable partition walls gave me a broad insight and overview of the possibilities. The results from the research strongly influenced my way of designing the interior layout within the building, implementing a fully detachable system of walls and other structuring elements. Furthermore, learning from the general advantages of CNC-milling, I expanded the application of in-house CNC production beyond partition walls for floor, roof and facade elements, which further strengthened my concept of local production.

How do you assess the value of your way of working (your approach, your used methods, used methodology)?

Overall, the methods I used for my research gave me valuable results for the implementation into my design, the assessment and comparison of existing demountable wall systems gave me good knowledge for applying in my own project. Due to the fact that the scope of my project grew over time (from only planning internal layout to adding new volumes to the existing building), I would have chosen a broader research topic dealing

with the overall advantages of CNC-milling. Yet, the research and the used methods proved to be valuable for my project.

I approached my design project by looking at various scales simultaneously, from the large urban scale down to the detail and by doing this, I think I managed to draft a comprehensive design which deals with the larger urban context as well as construction details and by looking at all scales at once, it was possible to tie all themes to the storyline of a waste-minimising micro-economy.

Sticking to a coherent storyline proved to be helpful for making design decisions, however, I also realised that I lost design freedom to a certain extent when trying to stick to one core theme. Overall though, I learned more from sometimes forcing design decisions into the framework of my storyline and thus achieving a more coherent design compared to engaging full design freedom and no restrictions.

The main design drivers, in-house CNC production and local construction material harvesting, came with notable design freedom restrictions. Nonetheless, by using them as a design tool, these drivers led to a unique and innovative design and showed me how certain limitations can lead to a very specific and strong output.

How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

With this graduation project I am proposing a design solution for revitalising the HaKa building and its urban surrounding on the thematic basis of a local micro-economy that focusses on minimising negative environmental impact and engages local production. Under this topic and by tying the design decisions to this core theme, I consider my graduation project to be valuable to the academic body. Beyond the building, the project showcases a possible way of dealing with neglected city areas by engaging a local economy.

From a societal point of view, the project strongly contributes to improving urban fabric, stimulating and supporting local economy, connecting city areas that were formerly strictly separated, thus creating new flows of people and improved communication.

How do you assess the value of the transferability of your project results?

Of course, the project is very site specific and applies to a unique building, yet the fundamental strategies of developing and revitalising neglected urban areas can be transferred to various sites with similar issues as the Vierhaven area. The idea of implementing local production enabled by state-of-the-art fabrication methods can be applied to sites that require architectural interventions as well as economic stimulation. The concept of reusing construction materials from demolished/dismantled buildings, although again in this project site specific, can in principle be applied anywhere if there are buildings to be torn down or deconstructed.